

# Overview of Renewable Energy Standard and Renewable Energy Credits

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## History of Renewable Requirements

- 2005 – Sustainably Priced Energy Enterprise Development (SPEED) Program
  - Required utilities to enter into long-term stably priced contracts for renewable resources
  - Did not require retirement of RECs
- 2009 – Standard Offer Program
  - Created a single, statewide procurement process for small (2.2 MW or less) renewable resources
  - Initially 50 MW, expanded to 127.5 MW in 2012
  - Initially, administratively determined price, moved to reverse bid process in 2012
  - Did not require retirement of RECs
- Net metering
  - 2008 – allowed group net metering, expanded overall cap from 1% to 2%; increased project size cap to 250 kW
  - 2011: Project cap expanded to 500 kW; registration process for small systems begins; overall cap expanded to 4%; solar adder introduced
  - 2014: Cap expanded to 15%; NM 2.0 process initiated
  - 2017: NM 2.0 starts; compensation based in part on whether RECs are given to utility



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## Renewable Energy Standard

- Enacted in 2015, compliance started 2017
- Tier I: Total Renewables
- Tier II: Distributed Generation carveout
- Tier III: Energy Transformation
- Tiers I and II require retirement of renewable energy credits (RECs)
  - Brings Vermont into line with the rest of the region



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## Tier I – Total Renewable Energy

- 2017 requirement of 55%, increasing by 4% every 3 years up to 75% in 2032
- Eligibility = any renewable plant delivering power into New England
- REC prices = \$0.25 to \$10
- Alternative Compliance Payment = \$10, increasing with CPI



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## Tier II – Distributed Generation

- 2017 requirement of 1%, increasing by 0.6% each year until 10% in 2032
  - Carveout of Tier I requirement
- Eligibility
  - Commissioned after 6/30/15
  - Less than 5 MW nameplate capacity
  - Interconnected to Vermont distribution or subtransmission



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## Tier II – Distributed Generation (cont.)

- REC Prices = \$15 - \$45
- Alternative Compliance Payment = \$60, increasing with CPI
- RECs from net metering resources must be retired and can be used for Tier II compliance



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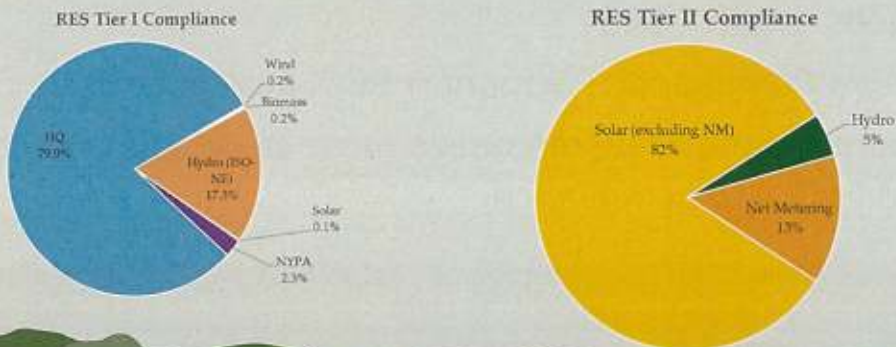


# Components of Tier II Compliance



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# Resources Used for 2018 Compliance



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## 2018 RES Costs and Benefits

	REC Retirements		Compliance Cost
Tier I	3,475,732	RECs	\$1,740,000
Tier II	98,222	RECs	\$2,570,000
Tier III	124,083	Mwhe	\$3,150,000
Total Cost of Compliance			\$7,460,000

Rate Impact of RES Compliance: 0.8%  
 CO2 Reduction from RES: 610,211 tons of CO2



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## RES Compliance

- Annual compliance required
- By August 31, utilities submit a compliance report showing:
  - Annual retail sales (kWh)
  - RES requirement
  - RECs retired
- RECs are associated with the calendar year that the energy was generated, called “vintage”



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## What is a Renewable Energy Credit (REC)?

- The renewable attribute from a MWh of generation by a qualified renewable resource
- Energy (MWh) and attributes (RECs) can be separated and traded independent of each other



**ENERGY:** power is generated and sent to the grid or used to offset customers' electricity usage. ISO-NE operates and manages the energy market in New England.

**RECs:** the environmental attributes associated with the generation. NEPOOL GIS is the platform in New England where RECs are created, traded and retired.



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## Why do we need RECs?

- Creates fungible commodity that can be traded
- Creates uniform system for ensuring that there is no double counting
- A utility can achieve RES compliance by purchasing RECs and does not necessarily need the physical energy from the renewable resources.



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## How do RECs work?

- The ownership of a REC provides the right to claim the associated renewability.
- RECs are the tool used for accounting, tracking and assigning ownership of renewable attributes.
- An eligible renewable resource can qualify its generation in different states such that attributes associated with that resource receive a “REC” designation.
- When a MWh of energy is generated by a qualified resource, a corresponding REC is “minted” in NEPOOL GIS.
- In NEPOOL GIS, certificates can be transferred between counterparties or retired for compliance and/or voluntary purposes. NEPOOL GIS enables the transfer of ownership to be traced.



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## What is REC trading?

- Attributes from one resource may be qualified RECs in multiple states
- REC market participants include utilities with compliance obligations, generators and speculators
- Trades can be direct (between two counterparties), arranged by a broker, through an auction, or an RFP
- Trades can range from short-term RECs only purchase for immediate delivery to long-term (20+ years) bundled Purchase Power Agreements for energy, capacity, RECs and other products.



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# NEPOOL GIS

*The NEPOOL GIS issues and tracks certificates for all MWh of generation and load produced in the ISO New England control area, as well as imported MWh from adjacent control areas.*

Regulators, such as the PSD, have access to reports in NEPOOL GIS to verify utility compliance

For each resource, NEPOOL GIS tracks several attributes, including:

- Plant Name
- GIS Unit ID
- Fuel type
- Facility location
- Nameplate capacity of project
- Project name
- Project vintage (build date)
- Certificate (generation) vintage
- Certificate unique identification number
- RPS/ RES eligibility



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# REC Pricing

- REC prices are determined by supply and demand
- Different Tier/Class eligibility means different values
- Similar markets tend to have similar pricing
  - VT Tier I, ME-Existing, RI-Existing all currently trade \$0.75 - \$2/REC
  - VT Tier II, CT-I, MA-I, NH-I, & RI-I all currently trade \$40/REC
- REC markets are volatile-- the commissioning or delays of large resources or changes in requirements can have a significant impact on supply and demand and result in large price swings



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# Historical Prices



Source: GT Environmental REC Brokers



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# REC Arbitrage

Arbitrage is the near-simultaneous buying and selling of commodities in different markets in order to take advantage of differing prices for the same or similar assets. REC arbitrage occurs when RECs from one project are sold and replaced by less expensive RECs from another project.

## A VERMONT EXAMPLE

Project	Kingdom Community Wind
Owners	Vermont Utility Owned– GMP & VEC
Location	Lowell, VT
Commissioning Date	November 2012
Type	Wind
Size	63 MW
REC Qualifications	VT Tier I, CT-I, MA-I, MA CES, RI-new

In 2018, GMP could use a \$27 REC from KCW or a \$1 REC from HQ for Tier I compliance. Least cost principle suggests using \$1 REC and selling KCW RECs into the MA, CT, or RI REC markets.



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## Tier III Structure

- Obligation placed on vertically integrated electric utilities
  - 2% of retail sales in 2017, increasing by 2/3 % each year until reaching 12% in 2032
  - Fossil savings converted to MWh(e)
  - Penalty for fossil fuel consumed by electric generation
- Aimed at delivered fuels – particularly fuel oil & propane
  - Natural Gas, covers ~50,000 customers – deliver regulated efficiency programs
- Alternative Compliance Payment: \$60/MWh(e) in 2017, increasing by CPI annually
- Can Use Tier II RECs for compliance
- Tier III Annual Plans, Integrated Resource Plans – outline programs, impacts to grid from added loads
- Verification of savings by Public Service Department; akin to energy efficiency programs



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## Tier III Eligible Projects

- Eligible projects include:
  - Line Extensions
  - Weatherization
  - Electric Vehicles
  - Electric Vehicle Supply Equip
  - Battery Storage
  - Use of Waste Heat
  - Pellet/Certain Wood Stoves
  - Biofuels (none pursued thus far)
  - Custom measures
  - Electrification of forklifts, lawn mowers, golf carts, etc.
  - Distributed Generation Above and Beyond Tier II



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